

Bachelor of Forest Science

First-year subjects

202-101 Chemistry for Land and Food Resources

See full subject details on page 1.

610-141 Chemistry A

See full subject details on page 2.

202-103 Biology for Land and Food Resources

See full subject details on page 1.

650-141 Biology of Cells and Organisms

See full subject details on page 1.

202-104 Information Technology and Communication

See full subject details on page 1.

202-107 Mathematics for Land and Food Resources

See full subject details on page 1.

207-113 Australian Rural Landscapes

See full subject details on page 1.

202-106 Land Resources

See full subject details on page 2.

610-142 Chemistry B

See full subject details on page 2.

207-101 Land, Food and Resource Economics

See full subject details on page 2.

207-103 Ecology

See full subject details on page 1.

650-142 Genetics & The Evolution of Life

See full subject details on page 1.

Second-year subjects

202-201 Plant Function

See full subject details on page 2.

202-202 Experimental Design/Statistical Methods

See full subject details on page 2.

202-203 Soil and Water Resources

See full subject details on page 3.

207-201 Resource Management Economics

See full subject details on page 2.

207-203 Techniques of Resource Assessment

See full subject details on page 1.

220-201 Native Forest Ecosystems & Biodiversity

Availability: Not offered in 2005.

Credit points: 12.5

Coordinator: Dr Chris Weston

Prerequisites: 654-142 Genetics and Evolution of Life; 207-103 Ecology or 606-204 Ecology: Communities & Ecosystems; 220-213 Trees and Forests.

Contact: Twenty-four hours lectures, 36 hours field work and excursions. Students are expected to undertake additional study of at least 1 hour for each hour of contact (*Semester 2*).

Description: This subject covers:

- composition, structure and dynamics of global native forests and woodlands;

- the range of Australian forests and woodlands - environmental gradients, natural disturbance regimes, pre-settlement forests and their present condition;
- relationship between forest history, response to disturbance, and forest structure;
- the role of fungi and invertebrate fauna in sustaining forest biodiversity;
- natural and managed regeneration of different forest types, regeneration processes and sources of regeneration; phenology of important genera;
- role of tree and forested ecosystems for conservation and biodiversity, monitoring and understanding biodiversity, corridors and fragmentation;
- ecosystem services performed by forests and woodlands;
- contributions of plantations and farm forests to biodiversity.

On completion of this subject students should have:

- A profound respect for truth, intellectual and professional integrity, the principles of learning, and the ethics of scholarship;
- A capacity for independent critical thought, innovation, rational inquiry and self-directed learning and research;
- An ability to identify and describe the biophysical, social and economic resources of natural and modified ecosystems, and integrate this information on a catchment scale;
- An ability to interpret the ecological history of individual forest and woodland sites, including the history of disturbance and human intervention;
- An awareness of and ability to utilise appropriate communication technology and methods for the storage, management and analysis of data;
- Highly developed oral communication skills to allow informed dialogue and liaison with peers, and with individuals and groups from industry, government and the community.

Assessment: One three-hour examination (40% of final marks), two project reports totalling 4000 words (40%) including an appropriately presented collection of relevant forest insects, and a group presentation (20%).

Prescribed texts: P Attiwill and B Wilson (eds), *Ecology: an Australian Perspective*, Oxford University Press, South Melbourne, Vic, 2003.

220-213 Trees and Forests

Availability: Parkville campus with use made of Creswick campus facilities through field trips.

Credit points: 12.5

Coordinator: Dr Peter Ades

Contact: Twenty-four hours of lectures and 24 hours of demonstrations and practical work, and one 3-day tour covering dendrology. Students are expected to undertake additional study of at least 1 hour for each hour of contact (*Semester 1*).

Description: This subject provides students with the basics of tree and forest biology, including dendrology (the natural history of trees), tree identification and uses, the characteristics of wood, and an introduction to tree and forest management.

On completion of the subject, students should:

- be aware of the biogeography and major evolutionary directions of woody species worldwide;
- be competent in the identification, taxonomy and morphology of eucalypts, conifers and deciduous hardwoods;
- be aware of the distribution, characteristics and uses of Australian forest species;
- be able to describe the features, composition and properties of a variety of woods, and methods used to identify timbers;
- be able to describe the type and status of global forest resources, including their products & uses;
- be aware of issues in management of trees and forest resources, of the objectives of forest management, and of methods for generating and evaluating alternative plans for the management of forest resources.

Assessment: A three-hour end-of-semester examination (50%), a term project (3000 words, 20%), two assignments (each up to 1500 words, each 15%).

Prescribed texts: L Costermans, *Native Trees and Shrubs of South-Eastern Australia*, Rigby, 1981. • P H Raven, R F Evert and S E Eichhorn, *Biology of Plants*, 6th edn, W H Freeman & Co/Worth Publishers, New York, 1999. • K Wilson and D J B White, *The Anatomy of Wood: its Diversity and Variability*, Stobart & Son Ltd, 1986.

220-270 Wood Science

Availability: Not offered in 2005.

Credit points: 12.5

Coordinator: Mr Philip Blackwell

Contact: Twenty-four hours of lectures and 36 hours of demonstrations and practical work, and 4-hour tour (*Semester 2*).

Description: On completion of this subject, students should be able to:

- describe the macroscopic and microscopic features of hardwood and soft-wood xylem and phloem;
- comprehend information regarding variability of wood;
- understand methods used to identify timbers;
- describe the processes of wood and bark formation including cell differentiation, cell wall layering and modifications;
- understand the effects of cell wall organisation on some wood properties;
- have a basic understanding of the chemical composition and properties of wood;
- understand anatomical, chemical and physical characteristics associated with heartwood formation, growth stresses, reaction wood and natural features in wood; and
- comprehend the meaning of a number of wood physical properties and basic wood-moisture relationships.

Subject content includes:

- wood and bark structure, anatomy and ultrastructure;
- macroscopic and microscopic features of wood;
- tree growth and wood quality, woody cell development, reaction wood, variability of wood;
- identification methods, growth rings and measurement of wood properties;
- wood chemistry, extractives, collapse;
- chemical utilisation of wood;
- engineering properties of wood; and
- natural characteristics and physical properties of wood.

Assessment: A three-hour end-of-semester examination (50%), a term project (20%), a practical exam (15%) and two worksheet assignments (7.5% each).

Prescribed texts: K Wilson and D J B White, *The Anatomy of Wood: Its Diversity and Variability*, Stobart & Son Ltd, 1986.

220-271 Forest Mensuration and Surveying

Availability: Not offered in 2005.

Credit points: 12.5

Coordinator: Mr Ian Wild

Corequisites: 202-202 Experimental Design and Statistical Methods

Contact: Twenty-four hours lectures and 36 hours practical work (*Semester 1*).

Description: On completion of this subject students should:

- possess basic skills in surveying;
- be able to prepare briefs and provide supervision for projects involving complex surveying or engineering; and
- be able to assess a forest and process inventory data successfully, estimate standing volume and yields, and understand how these are affected by site productivity and stand density.

Contents include:

- introduction to basic surveying instruments;
- closed traversing, distribution of errors;
- basic levelling procedure;
- measurement and computation of perimeter and area;
- pegging of simple curves;
- use of GPS systems;
- the use of standard equipment to measure tree and stand parameters such as diameter, basal area, height, volume, bark and crown;
- stem geometry, stem analysis and defects in trees and logs; and
- standard statistical techniques of sampling (random, stratified random, systematic and probability-proportional-to-size) for both resource inventory and experimental research.

Assessment: One three-hour written examination (50%) and two assignments equivalent to 3000 words (each worth 25%).

220-275 Processes in Forest Ecology

Availability: Not offered in 2005.

Credit points: 12.5

Coordinator: Dr Christopher Weston

Prerequisites: 202-103 Biology for Land and Food Resources, 650-142 Genetics and the Evolution of Life

Corequisites: 207-276 Field Studies and Dendrology

Contact: Twenty-four hours lectures and 36 hours practical work (*Year long*).

Description: On completion of this unit, students should be:

- competent in categorising Australian vegetation on both a structural and a floristic basis;
- identifying the major components of the Australian flora using keys; and
- familiar with basic ecological concepts from the organisational levels of the organism through to the biosphere, particularly in relation to forests.

Content includes:

- concepts and components of forest ecosystems;
- measurement of ecosystem function;
- approaches to analysis and synthesis of ecosystem function;
- taxonomy, systematics and nomenclature of floral and faunal elements
- theories of forest community structure, dynamics and diversity;
- field sampling, data acquisition and numerical analysis of ecosystem data; and
- biodiversity and ecosystem function.

Assessment: One three-hour examination (50%) and up to three practical assignments equivalent to 5000 words (totalling 50%).

Prescribed texts: Atiwill, P and Wilson, B, ed., *Ecology: An Australian Perspective*, Oxford University Press, 2003.

220-276 Field Studies and Dendrology

Availability: Not offered in 2005.

Credit points: 12.5

Coordinator: Mr Ronald Hateley

Prerequisites: 202-103 Biology for Land and Food Resources and 600-142 Genetics and the Evolution of Life.

Contact: Twenty-four hours lectures and 36 hours practical work (*Year long*).

Description: On completion of this subject, students should:

- have a better understanding of the integrated nature of forestry and land management in Australia;
- have basic skills including first aid, bush survival and dealing with emergencies; care, use and maintenance of hand-tools and chain-saws;
- have an appreciation of the setting in which field activities are conducted through exposure to forest work gangs, experienced field supervisors and Landcare groups;
- understand the use of computers in forestry;
- have an ability to use keen observation to interpret and analyse field observations; and have basic skills in fire survival and fire suppression methods;
- be competent in the identification, taxonomy and morphology of eucalypts, conifers, deciduous hardwoods and important elements of the Australian flora; and
- be aware of the distribution, characteristics and uses of many Australian forest species.

Assessment: One two-hour written examination (40%), and three assignments equivalent to 2500 words (each worth 20%). *Hurdle Requirement:* Attendance at a minimum of 80% of field days.

Prescribed texts: L Costermans, *Native Trees and Shrubs of South-Eastern Australia*, Rigby, 1981.

220-277 Forest Inventory and GIS

Availability: Not offered in 2005.

Credit points: 12.5

Coordinator: Mr Ian Wild

Prerequisites: 220-271 Forest Mensuration and Surveying or 600-203 Environmental Measurement.

Contact: Twenty-four hours lectures and 36 hours practical work (*Semester 2*).

Description: On completion of this subject, students should:

- understand the role of inventories in forest planning;
- learn to design, implement and manage timber, vegetation and/or wildlife inventories (multi-stage, multi-phase and variable probability); and
- learn the basic terminology, principles and characteristics of remote sensing and geographic information systems (GIS) technology, the use of GIS for interpreting, measuring and mapping natural resources, and how to apply advanced sampling theories and project management tools in the design and conduct of inventories using either remote sensing and/or ground inventory methods.

The course covers:

- photographic and digital remote sensing;
- vector and raster GIS, thematic map overlay;
- modelling and its use in forest management and planning; and

- the technical and managerial requirements for introducing remote sensing and GIS technologies.

Methods and processes for generating, evaluating and selecting alternative plans for the management of the resources (timber and others) will be introduced.

Assessment: One 3-hour written examination (50%) and two assignments equivalent to 3000 words (25% each).

Third-year subjects

202-004 Industry Placement#

Availability: Not offered in 2005.

Coordinator: Mr Rowan Reid

Prerequisites: As for 202-001 Industry Placement#

Contact: As for 202-001 Industry Placement# (*Year long*).

Description: As for 202-001 Industry Placement#

Assessment: As for 202-001 Industry Placement#

202-306 Industry Project

Availability: Creswick campus

Credit points: 25

Coordinator: Mr Rowan Reid

Prerequisites: As for 202-301 Industry Project

Contact: As for 202-301 Industry Project (*Year long*).

Description: As for 202-301 Industry Project

Assessment: As for 202-301 Industry Project

202-312 Industry Project

Availability: Not offered in 2005.

Credit points: 25

Coordinator: Mr Rowan Reid

Prerequisites: As for 202-303 Industry Project.

Contact: As for 202-303 Industry Project (*Semester 1, repeat 2*).

Description: As for 202-303 Industry Project.

Assessment: As for 202-303 Industry Project.

220-301 Forestry Field Camp

Note: Hurdle requirement

Availability: Creswick campus

Coordinator: Mr Ron Hateley

Contact: Two, 2-week periods of field experience and training, one in summer semester between Year 1 and Year 2; the other between Year 2 and Year 3 (*Summer semester*).

Description: Students undertake a total of four weeks of field experience and training over the course of the degree, made up of two 2-week field camps. The camps are held early in the summer semester. Students may obtain credit for proven competencies in relevant areas. Content includes

- development of basic field skills including first aid, bush driving and survival, Occupational Health and Safety and dealing with emergencies;
- care, use and maintenance of hand-tools and chain-saws;
- exposure to forest work gangs, experienced field supervisors, volunteer groups and Landcare groups;
- basic skills in fire survival and fire suppression methods;
- development of skills in communication, public speaking, dealing with the media, interview techniques, and techniques of public participation, conflict resolution, supervision, and personnel management.

On completion of the subject, students will have gained a range of skills and accredited forestry related competencies including First Aid, Axes and Slashers, Chemical Handling and chainsaw use.

Assessment: Attendance at a minimum of 80% of field camp days and participation in the skills components of the course. Acquisition of 80% of listed competencies based on formal criteria.

220-302 Tree Growth and Ecophysiology

Availability: Not offered in 2005.

Credit points: 12.5

Coordinator: Dr Gerd Bossinger & Dr Chris Weston

Prerequisites: 202-201 Plant Function *or* 606-201 Plant Structure and Function; 202-203 Soil and Water Resources.

Contact: Twenty-four hours lectures and 36 hours practical work (*Semester 1*).

Description: Subject content includes:

- Life cycles and tree development;
- Molecular aspects of wood, and the affect of genetics and silviculture on wood quality
- Flowering and tree developmental responses to environmental stresses;
- Ecophysiology of water and nutrient use, tree performance and environmental constraints on tree growth, interactions between light, water, nutrients and genetic capacity in limiting growth;
- Management of the interaction between light, water and nutrients to maximize carbon gain (growth) in planted trees;
- Current tools for measurement of physiological performance;
- Nutrient cycling in native forests and plantations, gas exchange and the C and N economies;
- Process-based models for forest growth.

Assessment: A three-hour end-of-semester examination (50%), and two project reports totalling 3000 words (50%).

Prescribed texts: H Lambers, F S Chapin and T L Pons, *Plant Physiological Ecology*, Springer, 1998.

220-303 Forest Inventory

Availability: Not offered in 2005.

Credit points: 12.5

Coordinator: Mr Ian Wild and Dr Leon Bren

Prerequisites: 220-213 Trees and Forests; 207-203 Techniques of Resource Assessment.

Contact: Twenty-four hours of lectures, 24 hours practical work and excursions and a three-day forest survey. Students are expected to undertake additional study of at least 1 hour for each hour of contact (*Semester 1*).

Description: The subject gives quantitative understanding of the role of inventory (forest and tree measurement and assessment) in planning the management of native and plantation forest resources. It includes planning and execution of a forest assessment, and processing of assessment data to a form suitable for input into forest management. Content includes:

- the importance of forest assessment, and the role of inventories in native forest and plantation resource planning for both wood and non-wood values;
- the use of standard equipment to estimate tree and stand parameters such as diameter, basal area, height, standing volume, bark and crown, stem geometry, stem analysis and defects;
- estimation of timber yields, and the effect of site productivity and stand density;
- the sources of assessment errors and their significance;
- use of remote sensing and GIS in forest inventories and project management;
- registration and rectification of maps and aerial photographs of forested areas;
- project planning, logistic, costs, and implementation issues, project management tools;
- advanced statistical techniques of design and sampling for inventory and research.

Assessment: One three-hour end-of-semester examination (50%), an essay (up to 1500 words, 20%), a group field inventory exercise (30%).

Prescribed texts: Lilles and Kiefer, *Remote Sensing and Image Interpretation*. • S A Aranoff, *Geographic Information Systems: A Management Perspective*. • P A Burrough, *Principles of Geographical Information Systems for Land Resources Assessment*. • M S Philip, *Measuring Trees and Forests*.

220-304 Silviculture

Availability: Not offered in 2005.

Credit points: 12.5

Coordinator: Mr Ron Hateley and Mr Mark Stewart

Prerequisites: 220-303 Forest Inventory; 220-201 Native Forest Ecosystems and Biodiversity; 220-302 Tree Growth and Ecophysiology.

Contact: Twenty-four hours of lectures and thirty-six hours of practical/field excursions. Students are expected to undertake additional study of at least 1 hour for each hour of contact (*Semester 2*).

Description: This subject provides an insight into wood and timber markets and how this relates to the tending and managing of forests and plantations. The subject brings together the science underpinning the growth and development of trees with the products that trees provide for a range of human use, and describes the principles and practices of forest establishment, regeneration and management for timber and other objectives.

Assessment: One two-hour examination (50%), and up to four assessment tasks throughout the semester (totalling 5000 words, 50%).

220-307 Fire Ecology and Management**Availability:** Creswick campus**Credit points:** 12.5**Coordinator:** Dr Kevin Tolhurst**Contact:** Twenty-four hours lectures and 36 hours of practical work (*Semester 1*).**Description:** On completing this subject, students should be competent in:

- basic fire-weather forecasting;
- understanding the principles of fire behaviour and the bases of fire danger ratings;
- understanding the principles of fire protection;
- having skills in planning and selecting appropriate fire-protection strategies;
- understanding the role and impact of fire in forest ecosystems; and
- having a knowledge of fire law.

The topics to be covered will include:

- fire history in Australia;
- combustion theory;
- forest fire behaviour prediction;
- fuel hazard assessment;
- fire weather observation and forecasting;
- fire danger rating systems;
- ecological effects of fire in forests;
- prescribed burning techniques;
- fire planning;
- fire suppression strategies and techniques; and
- fire law and fire management principles.

Assessment: A three-hour written examination (60%) and practical assignments equivalent to about 2000 words totalling 40%.**220-309 Forest Management and Access Systems****Availability:** Creswick campus**Credit points:** 12.5**Coordinator:** Dr Leon Bren**Prerequisites:** 207-277 Forest Inventory and GIS**Contact:** Twenty-four hours lectures and 36 hours practical work (*Semester 2*).**Description:** On completion of the subject, students should:

- understand concepts and methods for managing forests for sustainable production of goods and services, and be aware of forest use conflicts and methods to resolve them;
- obtain an introduction to the role of access in forest management;
- understand geometric alignment of forest access roads, balancing of earthworks, construction principles and practices, and the impact of such constructions on other forest values;
- obtain an introduction to basic business planning principles as applied to forestry endeavours, including cash flow planning and valuation procedures; and
- learn about the role of forest management information systems (including GIS) in decision making; wood production in even and uneven-aged forests; growth and yield predictions; yield regulation; computer modelling in decision-support systems; and different methods and criteria for evaluation alternative management strategies.

Assessment: One three-hour written examination (50% of total marks), and practical assignments (totalling 50% of final marks).**220-311 Forest Values, Landscapes and Society****Availability:** Creswick campus**Credit points:** 12.5**Coordinator:** Dr John Petheram**Prerequisites:** 207-113 Australian Rural Landscapes; 220-201 Native Forest Ecosystems and Biodiversity; 207-211 Resource Industry Economics**Contact:** Twenty-four hours lectures and 36 hours practical work. Students are expected to undertake additional study of at least 1 hour for each hour of contact (*Semester 2*).**Description:** Content includes:

- use of forests for production of wood and non-wood tangible products, water release and quality, carbon storage, biodiversity conservation and other ecosystem services, aesthetic and spiritual values, wilderness and recreation;

- community forest management, assessment of community values including aboriginal, industry and environmental organizations, and their incorporation in public and private forest management;
- landscape-level approaches to forest land-use planning, status, monitoring, and trends in selected forest and landscape indicators;
- environmental and social impacts of plantations and commercial forests.

Assessment: One three-hour written examination (50%) and two practical reports (3000 words) each worth 25% of final mark.**220-317 Applied Native Forest Ecology****Availability:** Creswick campus**Credit points:** 12.5**Coordinator:** Mr Ronald Hateley**Prerequisites:** 202-201 Plant Function, 207-275 Processes in Forest Ecology (or equivalent).**Contact:** Twenty-four hours lectures and 36 hours practical work (*Semester 1*).**Description:** The subject examines the need for managers of native forests on both public and private land to understand the environmental, social and economic issues that are involved in native forests being manipulated to achieve a range of outcomes. These outcomes include production of timber and other resources, rehabilitation of cleared or damaged areas and enhancement of habitat and biodiversity.

The content includes:

- environmental, social and economic inputs; relevant forest policies and legislation;
- an overview of Australian forests; Australian forests and environmental gradients; natural disturbance; pre-settlement forests and present condition; silvicultural systems;
- regeneration processes and sources of regeneration; phenology of important genera; seed collection, extraction, testing and storage; seedling establishment; seedbed preparation; seed treatment and application; monitoring of success;
- competition and stand thinning, shade tolerance and species competition, management of pests and diseases, treatment after fire and coppice management; and
- adaptations and management of selected native forest types.

Assessment: One three-hour examination (60% of final marks); and assignments and reports on practical work (totalling 40% of final marks).**220-323 Plantations and Farm Forests****Availability:** Creswick campus**Credit points:** 12.5**Coordinator:** Dr Christopher Weston**Prerequisites:** 202-201 Plant Function, 207-275 Processes in Forest Ecology (or equivalent).**Contact:** Twenty-four hours lectures and 36 hours practical work (*Semester 2*).**Description:** Trees are planted for a range of uses, including wood production, water table control and salinity mitigation, carbon credits and shade and shelter for stock. On completion of this subject, students should have developed a sound understanding of:

- methods for the mass propagation of selected trees;
- species and site matching for purposes such as salinity mitigation and optimum growth;
- the eco-physiology of water and nutrient use in farmed forests;
- management of the interaction between light, water and nutrients to maximise carbon gain (growth) in planted trees;
- the processes of tree improvement through tree breeding programs; and
- the changing political and environmental base for farming trees in Australia.

Assessment: One three-hour examination (50%), and up to four assessment tasks throughout the semester (totalling 50%).**220-329 Field Studies II****Availability:** Creswick campus**Credit points:** 12.5**Coordinator:** Mr Ronald Hateley**Prerequisites:** 207-276 Field Studies and Dendrology**Contact:** Field days and practical work (*Year long*).**Description:** On completion of this subject, students should:

- have a detailed understanding of the integrated nature of forestry and land management in Australia;

- be able to contrast and compare issues and practices; and
- have skills in communication, conflict resolution, supervision, dealing with the media and personnel management.

The course includes 20 field days, most conducted in the field, including one week involving the harvesting of trees from a coupe and the processing of logs in a sawmill. Small projects involve students managing local areas of land for specified purposes. Participation in a generic skills program involving public speaking, interview techniques, and techniques of public participation, parts of which will be delivered in collaboration with other subjects. An excursion of up to 10 days will examine the forestry and land management issues of regions too remote to be serviced by the field days.

Assessment: *Hurdle Requirement:* Attendance at a minimum of 80% of field days and participation in the skills components of the course.

Submission of a workbook equivalent to a 4000-word essay (100% of final marks).

220-331 Forest Health and Restoration

Availability: Creswick campus

Credit points: 12.5

Coordinator: Dr Leon Bren

Contact: Twenty-four hours of lectures and 36 hours practical work. Students are expected to undertake additional study of at least 1 hour for each hour of contact (*Semester 2*).

Description: Forest health and restoration requires an understanding of the factors affecting ecosystem development, stability and the productivity of major species, the theory and practice of rehabilitating degraded forests and the role of human intervention in maintaining ecosystem sustainability, community-based restoration management, restoration science and technology, adaptive restoration and ecosystem monitoring. Content includes:

- forest pathology: the significance of forest diseases, the principal groups of pathogens, host-parasite relationships, epidemiology and disease control;
- forest entomology: biology, frequency, control and importance of insects and other forest invertebrates;
- assessment of individual trees, plantations, and blocks of native forest;
- rehabilitation of damaged areas and enhancement of habitat and biodiversity, forest restoration;
- effects of forest management on forest health.

Assessment: A 3-hour written examination (50%) and up to three assignments totalling 50% (5000 words in total).

220-334 Trees, Genes and Environment

Availability: Creswick campus

Credit points: 12.5

Coordinator: Dr Gerd Bossinger

Prerequisites: 600-142 Genetics and Evolution of Life, 202-201 Plant Function, 207-270 Wood Science

Contact: Twenty-four hours of lectures and 36 hours of practical work (*Semester 1*).

Description: On completion of this subject, students should:

- have a good understanding of tree development and wood formation;
- have a basic understanding of plant molecular biology;
- appreciate the molecular basis of tree morphology, development and anatomy;
- know about methods for and implications of biotechnological modification of tree characteristics;
- understand molecular aspects of biodiversity;
- comprehend the importance of environmental triggers in tree development; and
- understand the importance of the application of modern approaches in forest management and research.

Subject content includes:

- life cycles and tree development;
- basic tree molecular biology;
- molecular aspects of wood quality, flowering and tree responses to environmental stresses;
- forest biotechnology; and
- assessment of genetic diversity within and between populations.

Assessment: One 3-hour written examinations (50% of final marks), and two 3000-word assignments (one mid semester, one end-of-semester, each 25% of final marks).

Prescribed texts: P H Raven, R F Evert and S E Eichhorn, *Biology of Plants*, 6th edn, W H Freeman & Co/Worth Publishers, 1999.

Fourth and Fifth-year subjects

220-401 Conservation Biology of Treed Landscapes

Availability: Parkville campus. Not offered in 2005.

Credit points: 12.5

Coordinator: Dr Kevin Tolhurst and Dr Steve Read

Prerequisites: 220-201 Native Forest Ecology and Biodiversity; 220-331 Forest Health and Restoration.

Contact: Twenty-four hours of lectures, 24 hours tutorials and practical work and field trips. Students are expected to undertake additional study of at least 1 hour for each hour of contact (*Semester 1*).

Description: Many rural landscapes include patches of forest, woodland, plantation and agriculture. Conservation biology recognises that the nature and properties of patches of "bush" depend on their surrounding environment, and accounts for disturbance and human intervention at various temporal and spatial scales. This subject describes how knowledge of forested systems and the biological requirements of their constituent organisms is used to ensure that their integrated management sustains, protects and (where necessary) restores these constituent species. Topics to be covered in a case-study approach include:

- the science of conservation biology;
- the importance of scale and pattern, complexity, connectivity and edges;
- conservation of genes, species and habitats;
- the application of spatially and temporally explicit models including Population Viability Analysis;
- the use and development of information management tools such as GIS and remote sensing, Decision Support Systems, Integrated Forest Management Systems, and monitoring systems.

Assessment: One assignment of up to 3000 words (20%), one term project of up to 5000 words (20%), and a two-hour end-of-semester exam (40%).

Prescribed texts: J Voller and S Harrison, *Conservation Biology Principles for Forested Landscapes*, UBC Press, 1998. • T R New, *Conservation Biology - An Introduction for Southern Australia*, Oxford University Press, 2000. • A Farina, *Landscape Ecology in Action*, Kluwer, Academic Publications, The Netherlands, 2000.

207-410 Agroforestry

Availability: Parkville campus

Credit points: 12.5

Coordinator: Mr Rowan Reid

Contact: Twenty-four hours lectures and 36 hours practical work (*Semester 1*).

Description: This course covers in detail the technical aspects of farm revegetation planning. Students will be expected to participate in field-based learning exercises and information gathering, and to contribute to discussion and debate. By the end of the subject students should:

- have a working knowledge of agroforestry diagnosis and design as an approach to the development of farm tree management opportunities on farms in Australia and overseas;
- have an understanding of the role of trees in providing for private landowner needs and aspirations;
- appreciate the importance of assessing landowners' needs, aspirations and performance criteria when designing agroforestry projects and development strategies;
- be able to develop technical design criteria for effective revegetation for resource conservation, agricultural production and direct commercial purposes;
- be able to undertake a multipurpose revegetation design project;
- be familiar with the opportunities for landowners to produce commercial forest products from private native forests; and
- be familiar with approaches to tree monitoring and evaluation.

Assessment: Two projects (total 50%) and three-hour examination (50%).

207-414 Social Research Methods

See full subject details on page 10.

202-302 Human Resource Management

See full subject details on page 3.

220-406 International Forest Policy

Availability: Parkville campus

Credit points: 12.5

Coordinator: Dr Leon Bren

Contact: Twenty-four hours lectures, 24 hours seminars, tutorials and self-directed study. Students are expected to undertake additional study of at least 1 hour for each hour of contact (*Semester 1*).

Description: The subject covers:

- principles of sustainable land use and environmental management systems;
- standards and certification systems, including ISO 14001, FSC and AFS systems;
- history of and international approaches to community forest management and implications for forest policy
- the regulatory framework for forest management including the Montreal Process, international conventions and national biodiversity and sustainability policies
- hierarchy of planning and management processes;
- land-use planning and landscape interpretation in decision-making;
- codes of practice, implementation, and review;
- international developments in forest policy.

Assessment: A three-hour written examination (50%), a written assignment (up to 3000 words, 30%) and an individual presentation on a forest policy issue (20%).

220-402 Wood and Timber Products

Availability: Parkville campus. Not offered in 2005.

Credit points: 12.5

Coordinator: Mr Philip Blackwell

Prerequisites: 220-213 Trees and Forests; 220-304 Silviculture

Contact: Twenty-four hours of lectures, 24 hours of tutorials and practical work, taught in block mode, plus a 3-day field trip. Students are expected to undertake additional study of at least 1 hour for each hour of contact (*Semester 2*).

Description: This subject covers the properties of wood, the range of wood-based products, and their production processes. Content includes the chemistry and physics of wood, its microstructure and ultrastructure, including defects and performance in demanding environments; the concept of wood quality and its impact on utility; the link between silvicultural practices and wood properties; and the stages of harvesting, saw-milling, timber grading, further processing and value-adding.

Assessment: Two projects (each up to 2000 words, each 20%), a 2-hour practical exam (20%) and a 2-hour written exam (40%).

Prescribed texts: K Wilson and D J B White, *The Anatomy of Wood: Its Diversity and Variability*, Stobart & Son Ltd, 1986.

220-407 Parks and Recreation

Availability: Parkville campus

Credit points: 12.5

Coordinator: Dr Leon Bren

Contact: Twenty-four hours of lectures and 36 hours practical work (*Semester 2*).

Description: On completion of this subject, students should have:

- an appreciation of the complexities of issues involving park management; and
- some competence in preparing plans to meet the challenge of these issues.

The content includes:

- factors important to the management of parks;
- tangible and intangible aims;
- conflicts of values and the concept of 'balance';
- role of legislation in the management of such areas;
- difficulties in implementation of legislation in the field;
- methods for protection of natural values from visitor pressure;
- conflict between priced and non-priced goods and services; and
- management of visitor areas and facilities.

Assessment: One three-hour examination (50%), a practical test (10%), and two practical work assignments equivalent to 2500 words (20% each).

207-413 Community Natural Resource Management

Availability: Parkville campus

Credit points: 12.5

Coordinator: Dr John Petheram

Contact: Thirty-six hours of equivalent contact time and 24 hours independent study, plus assignment work (*Semester 2*).

Description: On completion, students should be able to demonstrate sound understanding of theories underpinning community participation in manage-

ment, and will have practised techniques and processes in group facilitation and community assessment, planning and management of resources.

The content is presented under seven main headings:

- philosophy and evolution of participation and community management;
- models of community management of forests and other natural resources - overseas and in Australia;
- policy and institutional issues in community management;
- process and techniques in community enquiry, planning and research;
- issues in Koori community resource management;
- forms of evaluation in community management programs; and
- collaboration and conflict management.

Assessment: A 3000-word assignment in specialist interest area (40% of final marks); a practical exercise (30% of final marks); a two-hour final examination (30% of final marks).

Recommended texts: M Buchy and S Hoverman, *Understanding Public Participation in Forest Planning in Australia. How Can We Learn from Each Other?*, ANU Forestry Occasional Paper 99.2, 1999. • M Hobley, *Participatory Forestry: The Process of Change in India and Nepal*, Overseas Development Institute, 1996. • I Scoones and J Thompson (eds), *Beyond Farmer First: Rural People's Knowledge, Agricultural Research and Extension Practice*, International Technology Publications, 1994. • K Wilson and G E B Morren, *Systems Approaches for Improvement in Agriculture and Resource Management*, McMillan, 1990.

207-339 Hydrology and Catchment Management

See full subject details on page 2.

220-403 Forest Planning and Business Management

Availability: Parkville campus. Not offered in 2005.

Credit points: 12.5

Coordinator: Mr Ian Wild and Mr Peter Shepherd

Prerequisites: 207-201 Resource Industry Economics; 220-304 Silviculture; 220-311 Forest Values, Landscapes and Society.

Contact: Twenty-four hours of lectures, 24 hours tutorials and practical work. Students are expected to undertake additional study of at least 1 hour for each hour of contact partly involved with group forest planning assignment (*Semester 2*).

Description: This subject covers the management of forest businesses and decision-making for public and private forest organisations. Students will be required to work as part of a team to investigate a forested area, analyze appropriate forest information and prepare and present a balanced forest plan that includes recommendations for future management options. Content includes:

- Commercial objectives of forestry enterprises;
- Management of forest businesses and decision-making;
- Advanced budgeting, financial management and valuation, and assessment of silvicultural options;
- Long-term and short-term planning systems;
- Linear programming and simulation models for forest planning;
- Cost-competitiveness and technological improvement;
- Marketing and product mix.
- Development of multi-purpose management plans for native, industrial, farm or community forests.

Assessment: A two-hour end-of-semester examination (30%), oral presentation (20%) and 2000-word report (20%) on selected paper, group forest planning assignment (30%).

Prescribed texts: L S Davis and K N Johnston, *Forest Management*.

202-001 Industry Placement#

See full subject details on page 4.

202-301 Industry Project

See full subject details on page 4.

202-303 Industry Project

See full subject details on page 4.

202-401 Honours Research Project

See full subject details on page 5.

202-409 Honours Research Project

Availability: Creswick campus

Credit points: 50

Coordinator: Prof Roger Cousens

Prerequisites: As for 202-401 Honours Research Project.

Contact: As for 202-401 Honours Research Project (*Year long*).

Description: As for 202-401 Honours Research Project.

Assessment: As for 202-401 Honours Research Project.

202-402 Honours Research Project

See full subject details on page 5.

202-412 Honours Research Project

Availability: Creswick campus

Credit points: 50

Coordinator: Prof Roger Cousens

Prerequisites: As for 202-402 Honours Research Project.

Contact: As for 202-402 Honours Research Project (*Semester 1, repeat 2*).

Description: As for 202-402 Honours Research Project.

Assessment: As for 202-402 Honours Research Project.

202-403 Honours Research Project (MYE)

See full subject details on page 5.

202-415 Honours Research Project (MYE)

Availability: Creswick campus

Credit points: 50

Coordinator: Prof Roger Cousens

Prerequisites: As for 202-403 Honours Research Project (MYE).

Contact: As for 202-403 Honours Research Project (MYE) (*Semester 1, repeat 2*).

Description: As for 202-403 Honours Research Project (MYE).

Assessment: As for 202-403 Honours Research Project (MYE).

Elective subjects

Note: Insufficient enrolments may lead to a subject being suspended.

207-301 Global Environment and Sustainability

See full subject details on page 3.

220-409 Commercial Forest Management

Availability: Parkville campus

Credit points: 12.5

Coordinator: Mr Ian Wild

Prerequisites: 207-309 Timber Management and Harvesting

Contact: Twenty-four hours of lectures; 36 hours practical work (*Semester 2*).

Description: On completion of the subject, students should have:

- an understanding of the principles of commercial forestry;
- an ability to prepare budgets and undertake financial management; and
- an understanding and have skills in using forest planning techniques.

The content includes:

- commercial objectives;
- advanced budgeting, financial management and valuation, advanced silviculture;
- long and short-term planning systems;
- linear programming and simulation models for forest planning;
- cost-competitiveness and technological improvement;
- marketing; and
- product mix.

Assessment: A three-hour examination (50%) and two practical reports of 3000 words (each 25%).

220-411 Processes in Forest Ecosystems

Availability: Creswick campus

Credit points: 12.5

Coordinator: Dr Chris Weston

Prerequisites: Any one of 202-203 Forest Soils, 207-275 Forest Ecology, 606-204 Plant Ecology and 606-207 Flora of Victoria.

Contact: Twenty-four hours lectures, 36 hours practical work, including a 10-day excursion in February (*Summer semester*).

Description: This subject will cover the ecosystem processes that determine the distribution, diversity and productivity of forests and woodlands in south-eastern Australia, and their regeneration potential. The subject aims to pro-

vide a sound theoretical and practical basis for understanding processes and methods in forest ecology. The subject will include:

- vegetation and soils of forest ecosystems of south-eastern Australia, including assessment of floristic and faunal diversity, and animal-plant interactions;
- quantitative analysis of forest biomass, nutrient and bio-geochemical data at stand and catchment levels;
- forest productivity and nutrient cycling;
- the relevance of forests and forest soils in global carbon cycling and the emerging carbon economy; and
- the potential of reforestation for sequestration and storage of atmospheric carbon.

The subject involves the preparation, writing and oral presentation of a scientific report developed from the field practical.

Assessment: One major report (30% of final marks), an oral presentation (20% of final marks) and a 3-hour written examination (50% of final marks).

Prescribed texts: R H Groves, *Australian Vegetation*, 2nd edn, Cambridge University Press, 1994. • P M Attiwill and G W Leeper, *Forest Soils and Nutrient Cycles*, Melbourne University Press, 1987.

